Summitville

Water Treatment Plant
Remedial Design

Fact Sheet **March 04**

Colorado Department of Public Health and Environment

OVERVIEW

The purpose of this fact sheet is to provide information on the design of the proposed water treatment facility at the Summitville Superfund Mine Site. The remedial design for the facility was identified as the Preferred Alternative in Summitville's Record of Decision (ROD).

This highly automated and cost-effective facility is intended to replace the existing water treatment plant. Overall, the design will include the conveyance of contaminated water from the storage impoundment known as the Summitville Dam Impoundment (SDI), effluent discharge, and infrastructure modifications.

BACKGROUND

The ROD and subsequent engineering and feasibility analyses identified a single-stage, lime High Density Sludge (HDS) process as the preferred treatment method. The existing water treatment plant operates similarly to a single-stage, lime HDS plant, but is old, undersized and inefficient. Additional study on the feasibility of lime HDS (both single-stage and two-stage) was performed by URS Operating Services during a series of pilot plant studies conducted at the Summitville Mine Superfund Site in October 2002.

Resource Technologies Group, Inc. (RTG) reviewed historic data on the influent water quality and treatment goals in order to develop an understanding of the required contaminant removal for the new water treatment plant. Based on this analysis, several alternatives to the basic lime HDS process were identified. The review also looked at previous bench and pilot studies and existing plant operations to further understand achievable effluent quality and performance characteristics needed for a new water treatment facility.

A number of Remedial Action Objectives (RAOs) were identified in the ROD for the Summitville Mine Superfund Site. Specific RAOs pertaining to the management of contaminated water include the following:

- Control and treat surface water, groundwater and leachate to meet State and Federal Applicable or Relevant and Appropriate Requirements (ARARs).
- Re-establish State aquatic use classifications and attainment of water quality numeric criteria in Segment 3c of the Alamosa River and downstream.
- Attain metal concentration levels at the WF5.5 compliance point so that Alamosa River stream standards can be met.

The water treatment plant discharge criteria is based upon numeric standards and use classifications of the receiving stream. In the case of Summitville, both the existing and the new water treatment plants discharge into Wightman Fork, which then discharges into the Alamosa River Segment 3b, five and a half miles downstream. Segment 3b is the closest segment for which there are standards.

The discharge of the new water treatment plant is required to achieve Segment 3b numerical water quality criteria at the point of discharge to Wightman Fork. Segment 3b will be used as an extended mixing zone with a goal of meeting the aluminum and iron standards in Segment 3c. Therefore the water treatment plant effluent will meet aluminum and iron standards (waived in the ROD for Segment 3b) in Segment 3c.

As a result of the analysis conducted by RTG on both the URS treatability data and the recent bench scale studies, it was concluded that a 2-stage HDS treatment plant meets the ROD remedial action goals and would be instrumental in

conforming with remediation levels defined at WF5.5. The benefit of the two-stage HDS over the single-stage system is that it in addition to copper, manganese and zinc removal, it will also remove aluminum and meet the aquatic life viability tests.

DESIGN COMPONENTS

The location of the building will be next to the existing water treatment plant and oriented to reduce cut and fill requirements. Overall elevation across the building footprint is approximately ten feet, and grading can be such that retaining walls will not be required. The floor elevation has been set at 11,281 feet above sea level so a moderate amount of cutting will be required to the south and west. This material will be used for berms and for build up of parking areas and general access roads to the north and east sides of the building.

The building square footage is approximately 19,555 square feet (sf) of which 11,175 sf houses the processing equipment. The building footprint is rectangular, with the 140 foot by 84 foot processing room governing the building's orientation. A 56-foot high roof is dictated by the tallest piece of equipment and the roof structure is designed to carry 200 pounds per square foot snow load. A flat roof is designed to prevent snow from falling to the ground 56 feet below. The snow will also act as an insulator to the building.

The water treatment equipment includes a series of tanks at various elevations with the highest tank approximately 30 feet above the main floor. Inside the processing room, the equipment is connected by a series of catwalks, mezzanines and stairways. The main mezzanine level is located approximately 24 feet above the main floor. The water treatment plant has two garage bay doors located on the north side of the room for dump truck access to the filter press.

A reaction and clarification treatment system located in the processing room includes two stages of chemical reaction and clarification. Each stage is designed as a lime/HDS-type system with the following primary components:

- Mix tank where the recycled solids from the clarifier are mixed with the lime slurry;
- Reaction tank where the slurry from the mix tank is reacted with influent water;
- Flocculation tank where the overflow from the reaction tank is allowed to precipitate particles which promotes settling in the clarifier. The polymer is introduced in-line upstream of the flocculation tank; and
- Clarifier where the precipitate settles producing a clarified overflow and a dense sludge underflow. This clarified overflow water meets standards for discharge to Wightman Fork Creek.

The remainder of the building serves the plant staff, including a control room, offices, laboratory and maintenance. The building entry faces northeast and is oriented to the main access road that approaches from the north-west.

Heavy snowfall and spring runoff flows will be directed around the building. Drainage on the site typically flows from east to west, perpendicular to the proposed building layout. Surface runoff will be directed through swales around the building to existing drainage ditches (T-Ditch and P-Ditch) around the site. In addition, a drainage pipe will be placed around the building to direct subsurface flows away from the building and off the water treatment plant site. This subsurface drainage system will be tied into the Missionary Seeps drain line and directed to the impact basin and eventually to the SDI.

CONSTRUCTION

The construction of the new water treatment plant will be a large and difficult undertaking at a remote site such as Summitville. It is likely that construction will last for approximately two years, during which time the existing water treatment plant would continue to operate. When the construction is complete, the two treatment plants could operate side-by-side until the new facility is thoroughly tested and demonstrates compliance with effluent criteria.

The cost of constructing the new plant is estimated at $15,000,000. Currently, the EPA and Colorado Department of Public Health and Environment have been unable to obtain the necessary funding to initiate construction. At this time, there is no schedule to construct in the near future. Should funding be unavailable for several years, the design will be reassessed in light of updated information and changes in water treatment technologies. The public will be notified of any changes to the design that might be considered.

NEXT STEPS

We encourage interested citizens to review the remedial design report as it contains significantly more details about the

proposed water treatment plant. This fact sheet is intended to give a broad overview of some of the major components of the design.

A final review of the remedial design by the regulatory agencies will be complete by the end of September 2004. After which time, the report with be placed in the San Luis Valley document repositories located at the Del Norte Public Library, 790 Grand Avenue, Del Norte; and the NRCS office, 15 Spruce Street, in La Jara.

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Glossary

Applicable or Relevant and Appropriate Requirements (ARARs): Any state or federal clean-up statutes that apply to a particular remediation project.
Aquatic Use Classifications: The intended use of waters of the state; for example, drinking water, recreation, aquatic life.
Discharge Criteria: Restrictions established on quantities, rates, and concentrations in wastewater discharges.
Effluent: Water that has been treated and metal contaminants removed.
Influent: Contaminated water that enters the WTP, pumped from the SDI.
Missionary Seeps Drain Line: A pipe system that drains the Missionary Seeps area (near the water treatment plant).
Numerical Water Quality Criteria: Numerical values set forth that specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life.
Preferred Alternative: The preferred environmental cleanup remedy for a site or operable unit; listed in the Proposed Plan.
Record of Decision: The public document that explains which cleanup alternatives will be used at a Superfund Site.
Remedial Action Objectives: Objectives for the construction or implementation phase of a cleanup that follows remedial design.
Site-wide Operable Unit: Separate activities undertaken as part of a Superfund site cleanup.
WF5.5: A sampling station in Wightman Fork at the downstream Summitville mine site boundary.

Water Treatment Terms

Clarifier: Where the floc particles settle, producing a clear or clarified overflow and dense sludge.
Flocculation Tank: Where overflow from the reaction tank forms particles (floc particles) which promotes settling.
Lime Slurry: Dry lime powder is mixed with water to produce a solution that is mixed with influent.
Mix Tank: Where the recycled solids from the clarifier are mixed with lime slurry.
Polymer: A natural or synthetic chemical structure where two or more like molecules are joined to form a more complex molecular structure
Reaction Tank: Where slurry from the mix tank is reacted with influent water.
Single-Stage Lime High Density Sludge: Water treatment process that removes heavy metals from water by precipitating them out using a chemical agents.